

Notes on some Crinoids from the Neighbourhood of Madeira.

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MR. J. Y. JOHNSON, of Funchal, has recently been kind enough to send me specimens of various Crinoids which he has obtained from time to time in the neighbourhood of Madeira. None of them are new, but their occurrence in this locality is interesting, from its bearing on the question of geographical distribution. Three of them—*Pentacrinus Wyville-Thomsoni*, *Antedon phalangium*, and *A. lusitanica*—were found attached to a cable belonging to the Brazilian Submarine Telegraph Company, which was recently taken up for repair from a depth of 500–700 fathoms. Mr. Johnson tells me that “when hauled up, a great many objects were found attached to it; but as no stranger was allowed to go on board, and as the official people were too much occupied or too indifferent to Natural History to give themselves trouble in that direction, it was only with much difficulty, and by special favour, that I succeeded in securing a few objects, all of them, unfortunately, more or less injured.” It is much to be regretted that engineers in charge of ocean cables do not more generally follow the now classical example of the late Professor Fleeming Jenkin, whose careful preservation of the animals on the Mediterranean cable which he picked up in 1860 led to such important results.

1. PENTACRINUS WYVILLE-THOMSONI, *Jeffreys*. (See the Report on the Crinoidea, Zool. Chall. Exp. vol. xi. 1884, p. 313, pls. xviii.–xxiv.)

This species is represented by one adult and some young individuals, one of the latter having but thirteen arms, a number rather smaller than usual.

The original examples of this type were obtained by the ‘Porcupine’ off Cape Carvoeiro on the Portuguese coast, from a depth of 1095 fathoms. It has since been dredged by the ‘Talisman’ in 1480 metres off Rochefort; in 1917 metres off

Cape Cantin on the Morocco coast; and again in 1435 metres between the Canaries and Cape Verd Islands*.

Its discovery in the neighbourhood of Madeira somewhat increases its geographical range to the westward, and it is probably pretty generally distributed in the North Atlantic east of the meridian of 20° , between the parallels of 20° and 45° N. latitude. Curiously enough, however, neither it nor any Comatulæ were obtained by the 'Challenger' in any of the dredgings round the Azores, Canaries, or Cape Verd Islands. The 'Talisman' dredged Comatulæ in the neighbourhood of each group at various depths, down to 2300 metres; but her explorations in the Sargasso Sea seem to have been as unproductive of Crinoids as those of the 'Challenger.'

2. *ANTEDON LUSITANICA*, Carpenter. (See the Report on the Comatulæ, Zool. Chall. Exp. vol. xxvi. 1888, p. 109, pl. xxxix. figs. 1-3.)

Three examples of this species were obtained by Mr. Johnson from the Brazilian cable, thus extending its geographical range very considerably. The originals of the type were dredged by the 'Porcupine' in 740 fathoms off Cape Carvoeiro, together with some fragments of *Pentacrinus Wyville-Thomsoni*; and the renewed association of these two species on the cable near Madeira is therefore of interest. I think it very probable that the Comatulæ obtained by the 'Talisman' in depths of about 1200 metres off the Azores and Canaries, in 2200 metres off Agadir, and in 2330 metres near the Cape Verd Islands may belong to this deep-sea type. The former, however, might possibly also include *Antedon phalangium*, which is now known to extend down to at least 500 fathoms.

All Mr. Johnson's three specimens of *Antedon lusitanica* are

* It is much to be regretted that so little has yet been published respecting the results of the numerous dredgings made by the 'Talisman' in this portion of the Atlantic, during the summer of 1883. A brief, but useful epitome of the cruise has been given by the Marquis de Folin, in a small volume entitled "Sous les Mers" (Paris, 1887), from which I have obtained the data respecting the stations at which Crinoids were dredged, to which reference is made above. But the publication of the detailed reports on the various groups seems likely to be even longer delayed than were those of the 'Challenger'; for the work is entirely in the hands of a small number of French naturalists, who have no special knowledge of many of the groups on which they are reporting.

larger than those obtained by the 'Porcupine,' one of the cirri having 56 joints. One individual may have had but 10 arms; a second had 11 and perhaps more; but most of them are broken at the base, only one distichal series of two joints being left. The third had 14 arms or more, one bidistichate and three tridistichate series remaining; and of the six arms following these tridistichate series, three have the first pair of brachials united by syzygy (A. 3. $\frac{b}{2}$), while in the other three there is a syzygy in the second brachial (A. 3. 2*b*). We thus meet with a remarkable approximation to the characters of *Antedon multispina* and *A. porrecta*, which were obtained by the 'Challenger' near Tristan D'Acunha and Ascension, in depths of 550 and 420 fathoms respectively. The former type, like *Antedon lusitanica*, may sometimes have no more than ten arms, as in the six 'Challenger' specimens from Ascension; while the single individual from Tristan D'Acunha possesses one bidistichate and two tridistichate series, two of the arms borne on the latter having a syzygial union between the first two brachials, while the other two are of the ordinary type, with a syzygy in the third brachial. It is, of course, possible that tridistichate series may have existed in the other individuals of *Antedon lusitanica*, which have the arms broken at the syzygy in the third joint above the costal axillary; for there is now no means of deciding whether the epizygal of this syzygy was an axillary or a simple brachial. It is therefore not absolutely certain whether there are any ten-armed individuals of *A. lusitanica* at all, as seemed to be the case at first, before any tridistichate forms were known; and it is worth notice that in this one individual we meet with the characters of one ten-armed and three multibrachiate types of Comatulæ (A. 2.—A. 3. $\frac{b}{2}$.—A. 3. 2*b*), two of the latter being the same as occur in the single example of *A. multispina* from Tristan D'Acunha.

Should the tridistichate condition eventually prove to be common in these two species, it may become necessary to unite them under one name. At present, the main points of difference between them, apart from the characters of the arm-divisions, appear to lie in the longer cirri and less spinous arms of *A. lusitanica*, in which also the joints of the genital pinnules, as the Madeira specimens show, are somewhat produced upwards

on the outer side, as is so markedly the case in *Antedon basicurva*; but there is nothing of this kind in *A. multispina*.

3. ANTEDON PHALANGIUM, Müller, sp. (See the Report on the Comatulæ, Zool. Chall. Exp. vol. xxvi. 1888, p. 158, pl. xxviii. figs. 1-3.)

Mr. Johnson has sent me three examples of this species.

1. From the Telegraph-cable in Funchal Bay, at a depth of about 100 fathoms. Excepting for the extreme shortness of the later cirrus-joints, this is generally similar to the specimens obtained by the 'Dacia,' in 88 fathoms, on the Seine bank, between Madeira and the coast of Morocco.

This individual presents a curious instance of monstrosity. The position of the normal pinnule on the sixth brachial of one of its arms is occupied by a small axillary joint, which bears two pinnules of the usual character; while a third pinnule is attached to the distal edge of the arm-joint, on the dorsal side of the axillary.

2. From the Brazilian Cable, 500-700 fathoms. Two specimens.

One of these two individuals is fairly normal in its characters, with relatively narrow rounded rays which stand out well from the calyx, and do not come into lateral contact. But the other is somewhat remarkable; for it resembles many of the deep-sea Comatulæ which belong to the *Basicurva*-group, in the lateral approximation of its rays and the flattening of the outer sides of its first two brachials. I have noticed this feature in other examples of the type from shallower water, but have never seen it so marked as in this specimen, the discovery of which at 500-700 fathoms more than doubles the bathymetrical range of the type; and it is very interesting to find this increase of range associated with a peculiarity which is chiefly characteristic of the Comatulæ found in the abyssal zone; though its absence in the other individual from the same depth is a little puzzling. In fact, these two examples represent two very different varieties of the species. The distal edges of the arms and pinnules of the second specimen are fringed with rather large spines, a peculiarity which I have not noticed in any examples of the type obtained in other localities.

4. *ANTEDON DÜBENI*, *Böhlische*. (See the Report on the *Comatulæ*, Zool. Chall. Exp. vol. xxvi. 1888, p. 181, pl. xxxvii. figs. 1-3.)

The original of this species was obtained at Rio Janeiro, and another example was dredged by the 'Challenger' at Bahia. Some specimens from Madeira, kindly given to me by Professor Lovén, prove to belong to the same type; and Mr. Johnson has sent me others "from deep water, attached to corals and masses of *Ostræa* shells," in the same locality. Greeff's examples from the Canaries and from the Equatorial Island, Rolas, in the Gulf of Guinea*, are doubtless of the same nature. They have been described as *Antedon rosacea*, and I find some difficulty in differentiating the Madeira specimens among the many forms of this protean species. One of the chief characters of Böhlische's type is the presence of a minute plate between the first costals (second radials, *auct.*). But this intercostal plate is not well marked in the 'Challenger' specimens of *A. Dübeni*, though it reappears in all those from Madeira, in which also the first two brachials have sharp and straight outer edges. The latter feature, however, is very characteristic of the Naples variety of *Antedon rosacea*, in which, too, the intercostal plate sometimes appears, while both peculiarities occur in examples of this type from Ilfracombe, Milford Haven, the Shetlands, and the Faroe Channel. I have much doubt, therefore, as to *Antedon Dübeni* being a good species. The Madeira specimens are unquestionably identical with those from Brazil, and this is a point of some importance, as it adds another to the species of Crinoids which occur on both sides of the Atlantic †. But I find a great difficulty in making up my mind as to whether the numerous varieties of *Antedon rosacea* ranging from the Faroe Channel to Madeira, or even further, should all be referred to one species. It seems to be even more variable than *Antedon carinata* and *Actinometra parvicirra*, which is saying a good deal; but I am inclined to think that further study will confirm my present impression that all these forms represent but one specific type, to which the following names have been applied at different times:—

* "Echinodermen, beobachtet auf einer Reise nach der Guinea-Insel São Thomé," Zool. Anzeiger, 1882, V. Jahrg. pp. 116, 159.

† These are *Rhizocrinus lofolensis*, *R. Rawsoni*, *Antedon Eschrichti*, *A. quadrata*, *A. tenella*, *A. carinata*, *Actinometra pulchella*; and also *Antedon proliva*, if the Arctic species be included.

adeonæ, Della Chiaje.
annulata, Risso.
barbata, Linck.
bicolor, Della Chiaje.
bifida, Pennant.
coralina, Risso.
decacnemus, Pennant.
decameros, Gray.
Dübeni, Böhlische.
europæa, Leach.

fimbriata, Barrelier.
fimbriata, Dujardin (*non* Lamarck).
fimbriata, Miller.
gorgonia?, Fréminville.
mediterranea, Lamarck.
milleri, Müller.
pectinata, Linnæus (*non* Retzius).
petasus, Düben & Koren.
rosacca, Linck.

On a Hermaphrodite Trout, *Salmo fario*.

By Prof. CHARLES STEWART, Pres. Linn. Soc.

[Read 19th February, 1891.]

(PLATE III.)

FOR the opportunity of examining and describing this exceedingly remarkable, if not unique, specimen, I am indebted to the kindness of Mr. Thos. Andrews, of Westgate House, Guildford, who has presented it to the Museum of the Royal College of Surgeons.

The specimen is a well-nourished example of the Common Trout (*Salmo fario*). It is 300 millim. in length; and I am informed by Mr. Andrews that on two occasions ripe ova were, by artificial pressure, extruded from its belly; and these eggs, although kept completely isolated, on both occasions developed normal young.

The fish, when received by me, had been kept for some time in strong spirits, which had made the body rigid in a bent position. The abdomen also had been opened, and a partial examination made.

In the body-cavity were between two and three dozen loose ova; these had apparently escaped from a rupture in the posterior extremity of the right genital gland (ovary), or from near the posterior end of the right genital duct, which appeared to be either ruptured or defective at this point.

The genital glands were both loosely attached by a fold of peritoneum, which commenced at the extreme anterior end of the body-cavity, and extended along the outer borders of the swimming-bladder.